TWO PAPERS

ON

MANUAL TRAINING,

BY

WILLIAM T. HARRIS:

I.

THE INTELLECTUAL VALUE OF TOOL WORK.

II.

THE EDUCATIONAL VALUE OF MANUAL TRAINING.

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I.

THE INTELLECTUAL VALUE OF TOOL WORK.

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Man, like the animal, has natural wants, which he must gratify in order to live on the earth. While the animal needs food, and to some extent shelter, man needs food, and shelter, and clothing. In order to get possession of these things, he must struggle for them and wrest them from nature, depriving plants and animals of their vital principles and converting them to his own uses. Whereas the plant feeds upon soil and atmosphere in so far as it finds them in immediate contact with itself, and the animal is able to seek a new environment and use its limbs as tools or instruments with which to seize upon the means of supplying its wants, man on the other hand, although less endowed with strength than many of the animals, and with scanty natural provision for clothing, yet is able to surpass the animal in gratification of his wants, by cunningly aiding his natural forces and instruments by invented ones. He devises instruments out of natural materials, mineral, animal, and vegetable substances and their chemic elements, of such efficiency as to enable him to command the resources of land, and sea, and air.

Whatever seems at first a limitation to him, or a hostile might threatening him with destruction, or imposing upon him the necessity of drudgery for daily assistance, becomes by and by an auxiliary power friendly to man after he has conquered it by the magic of his intellect.

Man as inventor of tools and machines, and the combiner of ature's forces, presents for us the most interesting object in the uni- erse. Let us take a survey of him as the maker of tools and the wielder of them. Intellectual and moral power unite to give man his power of invention. It is intellectual cunning which discovers he powers and adaptations of things and converts them to his uses. t is the moral power of self-conquest that enables man to sacrifice he ease and comfort of the present moment and to endure priva- ion, in order by industry and patient attention to accumulate a apital of physical means and acquired experience sufficient to roduce an invention.

The first step above the brute instinct begins when man looks be- ond things as he sees them existing before him, and commences to onsider their possibilities; he begins to add to his external seeing

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an internal seeing; the world begins to assume a new aspect; each object appears to be of larger scope than its present existence, for there is a sphere of possibility environing it, a sphere which the sharpest animal eyes of lynx or eagle cannot see, but which man, endowed with this new faculty of inward sight, perceives at once. To this insight into possibilities there loom up uses and adaptations, transformations and combinations in a long series stretching into the infinite behind each finite real thing. The bodily eyes see the real objects, but cannot see the infinite trails; they are invisible except to the inward eyes of the mind.

What we call directive power on the part of man, his combining and organizing power, all rests on this power to see beyond the real things before the senses to the ideal possibilities invisible to the brute. The more clearly man sees these ideals, the more perfectly he can construct for himself another set of conditions than those in which he finds himself.

Men as tool workers, as managers of machines, participate in this higher kind of perception in different degrees, but all have it to some extent. The lowest human laborer has the dimmest notions of these ideals; they are furnished him by others; he is told what to do; he furnishes the hands to work with, and some one else furnishes the brains or most of the brain work. Unless a directing mind is near by to help at every moment with the details of some ideal, the rude laborer ceases his work, having no knowledge of what is required next. His capacity to grasp an ideal is very small; he can only take it in tiny fragments—small patterns dealt out to him as a hand by the directing brain of the overseer or "boss."

It seems a waste of power to have two brains to govern one pair of hands. It is evidently desirable to have each laborer developed in his brain, so as to be able to see ideals as well as to realize them by his hands.

The development of this desirable power we call education of the intellect, and its chief means is science. Science is the systematized results of observation. Each fact in the world is placed in the light of all the other facts. All facts are made to help explain each fact. This is science. Now each fact represents only one of the many possible states of existence which a thing may have. When one state of existence is real the others are mere possibilities, or, as they are called, "potentialities." Thus water may exist as liquid, or vapor, or ice, but when it is ice the liquid and vapor states are mere potentialities.

Science collects about each subject all its phases of existence under different conditions; it teaches the student to look at a thing as a whole, and see in it not only what is visible before his senses, but what also is not realized and remains dormant or potential. The scientifically educated laborer, therefore, is of a higher type than the mere "hand-laborer," because he has learned to see in each thing its possibilities. He sees each thing in the perspective of its history. Here, then, in the educated laborer, we have a hand belonging to a brain that directs, or that can intelligently comprehend a detailed statement of an ideal to be worked out. The laborer and the "boss" are united in one man.

There are, as we have said, different degrees of educated capacity, due to the degree in which this power of seeing invisible potentialities or ideals is developed. The lowest humanity needs constant direction, and works only under the eye of an overseer; it can work with advantage only at simple processes; by repetition it acquires

skill at a simple manipulation. The incessant repetition of one muscular act deadens into habit, and less and less brain-work goes to its performance. When a process is reduced to simple steps, however, it is easy to invent some sort of machine that can perform it as well or better than the human drudge. Accordingly, division of labor gives occasion to labor-saving machinery. The human drudge cannot compete with the machine, and is thrown out of employment and goes to the almshouse or perhaps starves. If he could only be educated and learn to see ideals, he could have a place as manager of the machine. The machine requires an alert intellect to direct and control it, but a mere "hand" cannot serve its purpose. The higher development of man produced by science therefore acts as a goad to spur on the lower orders of humanity to become educated intellectually. Moreover, the education in science enables the laborer to easily acquire an insight into the construction and management of machines. This makes it possible for him to change his vocation readily. There is a greater and greater resemblance of each process of human labor to every other, now that an age of machinery has arrived. The differences of manipulation are grown less, because the machine is assuming the handwork, and leaving only the brain work for the laborer. Hence there opens before labor a great prospect of freedom in the future. Each person can choose a new vocation and succeed in it without long and tedious apprenticeship, provided that he is educated in general science.

If he understands only the theory of one machine he may direct or manage any form or style of it. He could not so easily learn an entirely different machine unless he had learned the entire theory of machinery. The wider his knowledge and the more general its character, the larger the sphere of his freedom and power. If he knows the scientific theory of nature's forces he comprehends readily not only the machines, but also all nature's phenomena as manifestations of those forces. Knowledge is educative in proportion to its enlightening power or its general applicability. The knowledge of an art is educative because it gives one command in a sphere of activity; it explains effects and enables the artisan to be both brain and hand to some extent. A science lifts him to a much higher plane educatively, because he can see a wide margin of possibilities or ideals outside of the processes in use, and outside of the tools and machines employed.

Education, then, takes these three steps: First, to do what is directed by authority; secondly, to know the theory of the art or trade as it is and has come down by tradition; thirdly, to know the general science of the subject, and comprehend not only the processes that have been realized, but the possibility of others.

The civilization in which we live is well characterized as a scientific one, and it is making great strides toward the conquest of nature. It demands, too, as we see, an education for all people. There is less and less place left for the mere drudge, all hands and no brains. Machinery can do his work so cheaply that his wages must be very slender. The education demanded, moreover, is not the training in technical skill so much as in science. For the more general training emancipates the laborer from the deadening effects of repetition and habit, the monotony of attending the machine, and opens up a vista of new invention and more useful combinations.

While the student is learning a method of doing something his brain is exercised; when the process has become a habit it is com-

mitted to his hand, and his intellect is not required again except for new combinations. This is true of all machine work, of all tool work. Its theory is soon exhausted, and the deadening process of habit sets in. Science is perpetually living, always educative. The mind goes from principle to principle; it discovers and inventories new provinces of nature, and applies its principles to their explanation. In reaching vaster unities of nature it finds deeper principles.

Not the study of tools and machinery, but that of natural science, is more educative, therefore, because it keeps the mind in perpetual activity.

If we pause here and ask ourselves, what is the scope of the inquiry thus far made? we shall be obliged to confess that we have regarded man only in his animal nature, possessing bodily wants of food, clothing, and shelter. We see at once that this is no inventory of man's wants—it falls infinitely short of his requirements as a spiritual being. If machinery were invented so that he could get food, clothing, and shelter in abundance and of the finest quality at the cost of a moment's labor each day, all this would be of small account as an item of civilization unless the human energy saved from drudgery had found channels of expenditure in the vocations relating directly to the education of the spiritual nature of man.

Here we come to the all-important distinction between that which belongs only to the nature of a means instrumental to something else different from itself, and that which is an end for itself. The human mind or soul is an end for itself. Matter and the body are only instrumental, only means for the perfection of the soul.

What, we inquire, are the ideals of perfection of the soul, then? For it would seem that all through our industrial processes there should have prevailed a guiding purpose to subordinate all human endeavor to the interest of the mind. We have already taken note of the science of nature as a purely theoretical study, more educative than any form of art because it is the source of inexhaustible activity in the intellect. Nature in time and space is one world for man's scientific mastery. Over against this there is another world for his science, the world of mind.

Nature is before us as organic and inorganic realms. Mind reveals itself in three forms, thinking, willing, and feeling. Leaving this psychological point of view, it will be more interesting for us to look at the world of humanity in three aspects. Human nature has revealed itself in institutions, social structures organized so as to make the strong help the weak; the mature assist the immature; the wise the simple; these institutions are the family, civil society, the state or nation, and the church. These institutions are the outgrowth of the human will. In the business of education the youth learns human nature as will in studying history—history taken in a very broad sense. But even history in a narrow sense gives him glimpses of all these institutions acting and reacting upon each of these. One sees the evolution of civilization by the study of history. Here, then, is a branch of study which we must regard as educative in the highest possible degree. Natural science, valuable as it is in emancipating us from drudgery, is rather a science of that which is a means for the development of man as a spiritual being. But history is a science of that which is an end for itself, because it is the exhibition of the structure and evolution of civilization.

History is only one of the spiritual sciences. There are sciences that relate to mind as intellect in its essence such as philosophy and

psychology and logic, with kindred sciences like comparative philology offering to us the revelations which different peoples of the earth have made of their mental structure in language. This study deals also with that which is an end for itself. Again, there is the department of literature and art, in which man has portrayed for himself his human nature in the form of feelings and convictions leading outward and upward to thoughts and actions. For the heart is in a certain sense the primitive fountain from which flows the life-thread before it is divided into the strands of intellect and will. Literature shows us this deepest source of civilization. Homer, Dante, Shakespeare, and Goethe reveal prophetically what after ages work out into clear thoughts and actions. Here then is another, and a very important study of what is always an end for itself.

History, the revelation of the nature of human will; philology and philosophy, the revelation of what is essential in the human intellect, or the divine part of it; literature and the fine arts, the revelation of the human heart!

First, human nature evolves a dim feeling; then develops it into an idea; then realizes it in a deed, and it becomes an institution to bless the race.

There are three departments to the world of human nature, and two departments to the world of nature below man—organic in plant and animal, inorganic in matter and force.

With this survey of human learning, we are now prepared to see what the school has done in the past and present to provide an educative process for the child by giving him a survey of the two worlds in which he lives, the material and spiritual worlds—the world of means to an end outside of itself, and the world which is an end for itself.

School education should open five windows of the soul, and let it look out upon the two departments of nature and the three departments of mind. Now it surprises us at first to see that school education has done this very thing by its course of study. Arithmetic gives the first glimpse of inorganic nature, for it reveals the nature of quantity, and quantity gives the law to time and space, and to all bodies. Then in geography a glimpse is given of organic nature as related to the inorganic on the one hand, and as related to man on the other—a very educative study indeed! Then there is grammar, which looks into the logical structure of the intellect as revealed in language; history, which reveals the human will; literature in the school readers, showing how the great geniuses of the language have revealed the aspirations of the people in impassioned prose and poetry.

The school does something more than give this all-round glimpse of man's five-fold world. The school teaches the pupil how to restrain his animal impulses to prate and chatter, disturbing the work of others, and himself idle; it teaches him the great lesson of industry and perseverance; it teaches him regularity and punctuality, the great virtues that lie at the basis of all human combination; it teaches courtesy and good social behavior; it lays greatest stress on truth-speaking, by showing the pupil in every recitation how important it is to be accurate in statement, and to fix the exact facts by verification and research.

The studies and disciplines of the school therefore open the windows of the intellect upon all points of the horizon of existence, and they train the will to labor at what is most difficult because most

unusual for the animal nature. The lower organized human being can work with his hands with pleasure, while it is still a task of great difficulty for him to contemplate ideas or undertake any sustained trains of thought. If youth can be taught to bring their powers to bear on such ideal subjects as arithmetic, grammar, history, and literature, they certainly can with ease give their mind to any form of manual training or the work of external observation, because the greater includes the less, and the studies of pure science are far more difficult to carry on than studies in applied science.

If we now ask the question, What is the comparative value of tool work? we may see our way to reply, Tool work without the theory of construction is educative to some extent, especially in the first stages of its practice. Tool work taught with the theory of machinery, with applied mathematics, is far more educative than mere tool work, and its educative influence lasts for a much longer time. Tool work with its theory and with natural science is permanently educative, and it does much to raise manual labor above drudgery, and especially is this the case if it is studied with the history of ornamentation and with careful cultivation of æsthetic taste.

But when compared with the present course of study in the schools it cannot be claimed that manual training opens any new windows of the soul, although it may give a more distinct view from the window that opens towards inorganic nature.

There remains, notwithstanding, a permanently valid place for the manual-training school side by side with apprentice schools for all youths who are old enough to enter a trade, and who are unwilling to carry on any further their purely culture studies. Cultivate the humanities first, and afterwards the industrial faculties. In our civilization there ascend out of the abyss of the future, problems of anarchy on the one hand and of socialism on the other; individualism carried to such extremes that all subordination to peaceable and established law is deemed a fetter to freedom. This centrifugal tendency to anarchy is paralleled by a centripetal tendency that wishes to have the central government perform not only all the duties of establishing justice and securing the public peace, but also to have it own all the property and manage all the industries. In short, the nationalists propose abolishing the sphere of competition and individual enterprise. Education in the history of the world, and in the literature that reveals the aspirations of the human heart, is well calculated to prepare the youth for a rational verdict on the extreme issues that will continually arise among a free people. Above all, we must never yield to the economic spirit that proposes to curtail the humanizing studies in our schools for the sake of adding special training for industries. Rather must we do what we can to extend the period of study in pure science and the humanities, knowing as we do that all which goes to develop the ability of the youth to see possibilities and ideals, goes to make him a more productive laborer in the fields of industry.

II.

THE EDUCATIONAL VALUE OF MANUAL TRAINING.

A REPORT MADE BY THE COMMITTEE ON PEDAGOGICS TO THE NATIONAL COUNCIL OF EDUCATION IN SESSION AT NASHVILLE, TENNESSE, JULY 15, 1889, DURING THE ANNUAL MEETING OF THE NATIONAL EDUCATIONAL ASSOCIATION.

REPORT BY THE COMMITTEE ON PEDAGOGICS.

To the National Council of Education:

The undersigned Committee on Pedagogics hereby offer their report on the subject of the Educational Value of Manual Training, a subject that has come to be of prime importance by reason of the strong claims set up for it by its advocates, and, secondly, by reason of the fact that as a cause it serves to unite not only the critics of the educational system already existing, but also its uncompromising enemies; thirdly, becausé the claims set forth in its behalf are based not on economic reasons, but on educational reasons, an assumption being actually made that the effect of manual training on the pupil is educational in the same sense as the branches of science and literature heretofore taught, or at least, if different from them, of equal or of superior value to them. This assumption unsettles the entire question of course of study, in so far as it rests on the doctrine of a specific educational value for each of the branches of the course of study, and in so far as it is supposed that the present list of branches provides for an all-sided intellectual training.

WHAT THE COMMITTEE PROPOSE TO DISCUSS.

Your committee accordingly have proposed to themselves in this report to discuss the various phases of this assumption and to inquire in what precisely consists the educative value of the branches taught in the manual training school, and wherein they are supplementary of the work already done and wherein they cover the same ground. They have proposed to treat incidentally also the economic questions involved, inasmuch as the popularity of the movement has its foundation in the conviction that if the schools teach manual training all pupils will be fitted for useful industries before the age of leaving school for business.

PRELIMINARY ADMISSIONS.

1. Your committee in the outset admit the reasonableness of substituting a system of manual training in special schools, in so far as it can be done, for the old system of apprenticeship. That said apprenticeship has been and is wasteful of the time and talents of the pupils is conceded; that a school devoted to the business of

educating the youth in the essentials of his trade or vocation is superior to the old system that employed the apprentice in all the drudgery of the establishment and postponed his initiation in the essential matters of his trade. But your committee insists that such manual training ought not to be begun before the completion of the twelfth year of the pupil, nor before he has had such school instruction in the intellectual branches of school work, namely in reading, writing, arithmetic, geography, grammar and history, as is usually required by those statute laws enforced in enlightened States to prevent the too early employment of minors in the industries and the neglect of their school education.

Your committee understand that any amount of manual training conducted in a school is no equivalent for the school education in letters and science, and ought not to be substituted for it. They hold the opinion moreover that neither apprenticeship nor the industrial school should be allowed to take possession of the youth until the completion of his twelfth year at least; the fifteenth year is still better, because physical maturity is necessary for the formation of the best muscular movements to produce skill.

REASONS WHY TRAINING IN THE USE OF TOOLS SHOULD NOT BEGIN TOO EARLY.

At too early an age the pupil with his small hands and fingers, his short and undeveloped arms is obliged to acquire bad habits of holding the implements of labor, just as a child that commences holding a pen too early will not hold it so as to secure freedom of movement. Moreover, the serious occupations of life cannot be imposed on children without dwarfing their human nature, physically, intellectually and morally, and producing arrested development. Not only the games of youth, but the youth's freedom from the cares of mature life should be insured to him if the best preparation is to be made for manhood. It is sad to know that very many children are dwarfed by family necessity, which compels them to bear the weights and cares of mature years. The street gamin in the city is preternaturally acute, but is not in process of growth towards ideal manhood. Later on he will be found suffering from premature old age, in every respect a wasted human life burnt out before it could develop its moral and intellectual ideals. He will have a "Punch and Judy" face such as Dickens ascribes to the stunted products of London street education. Students of anthropology tell us that man surpasses the animals so much in his mature life because he has a so much longer period of helpless infancy. He passes through a hundred grades of ascent above the brute, using all his forces in learning to walk on his hind legs, to use articulate speech for intercommunication, to dress himself in clothes and to put on that far subtler clothing of customs and usages which hold back and conceal his animal propensities and substitute courtesy towards others for selfish natural impulse. Were it not for this diversion of the forces of childhood man might develop like the animals the ability to walk immediately after birth and use his bundle of intellectual instincts at once without the necessity of a long process of education.

TO PROLONG THE PERIOD OF CARELESS CHILDHOOD, DESIRABLE.

On these grounds your committee deprecate the necessities which abridge the period of childhood, and consider this one of the first reforms that social science is demanding, namely the protection of children from the premature assumption of the cares of life. The work of the kindergarten, the schools for waifs and this line of effort will stop the growth of that hopeless class of society that has become arrested below the moral stage of development.

The ever present argument of the economical view of education calls attention to the fact that the great majority of children are destined to earn their living by manual labor. Hence it is argued the school ought to prepare them for their future work. The scientific view that lays so much stress on the protraction of the period of human infancy is opposed to this demand for filling the child's mind with premature care for his future drudgery.

In fact, this scientific doctrine has already been anticipated by the humane Christian sentiment which has founded public schools; for there is a conviction deep seated in the minds of the people that all children ought to be educated together in the humane studies that lie at the basis of liberal culture. Just for the very reason that the majority have before them a life of drudgery, the period of childhood in which the child has not yet become of much pecuniary value for industry, shall be carefully devoted to spiritual growth to training the intellect and

will and to building the basis for a larger humanity. Such a provision commends itself as an attempt to compensate in a degree for the inequalities of fortune and birth. Society shall see to it that the child who cannot choose the family in which he shall be born shall have given him the best possible heritage that fortune could bring him, namely, an education that awakens him to the consciousness of the higher self that exists dormant in him. The common school shall teach him to conquer fortune by industry and good habits and the application of the tools of thought.

THE WRONG DONE THE CHILD'S HIGHER NATURE BY A MERELY PRACTICAL TRAINING.

The economic, utilitarian opposition to the spiritual education in our schools comes before us to recommend that we forecast the horoscope of the child, and in view of his future possible life of drudgery make sure of his inability to ascend above manual toil by cutting off his purely intellectual training and making his childhood a special preparation for industry.

Your committee would at this point call attention to the fatal omission on the part of the economist to see what is implied in his statement that the schools should fit the child for his future duties in life. For when we inquire we discover at once that the trade or vocation in life is but a small part of the total functions of any one's life. It is what goes with the trade or vocation that makes even it a success or failure. What does one need to know besides his trade? To this question your committee enumerate the following:

THE INTERESTS OF SOCIETY AND THE STATE ALIKE DEMAND A BROADER EDUCATION.

First under the head of behavior toward others, his success will depend on his treatment of his fellow-workmen and his employers; on his treatment of his neighbors, and of his family and children. Moreover his behavior as a citizen concerns vitally all who live with him under the same Government; for he conditions to the extent of his single vote; and the proletariat class as a whole may form a majority, and determine altogether what sort of government shall be placed over all, rich and poor, Christian or heathen, humane or selfish. The dude citizen who inherits large wealth and believes that the laboring classes should not be educated beyond the station they are to occupy in life will find that the manual laborers are also voters, and that they decide whether there shall be right of private property or protection of life and limb for him as well as for others.

The illiterate manual laborer, no matter how skilfully educated for his trade in wood and metal operations, cannot read and write. He cannot read the newspaper and take interest in the doings of town, State and Nation, or world at large, except as he hears of it in the turbid stream of personal gossip from fellow-workmen. He is essentially shut in and his thoughts move around in a narrow circle like the horse that turns the wheel of the mill. Nothing can prevent his being the victim of wild schemes of agitation that attack radically all the institutions of civilization. To the observer of the newer and newest phases of modern history, nothing is so clear as the fact that the first necessity of civilization is a system of universal education, not in industry, but in the ideas and thoughts that make up the conventional view of the world — such ideas and opinions as one learns in studying geography and history, and especially literature.

THE EDUCATIVE VALUE OF MANUAL TRAINING ANALYZED AND DEFINED.

2. Your committee would now call your attention, in the second place, to the educative phases of manual training. They admit that manual training is an educative influence; for all that man does or experiences is educative to him, and affects both his will and his intellect. The education of the will takes place by fixing or unfixing habits of doing; the education of the intellect takes place through the ascent from one thought or idea to another; from a narrow point of view to a broader and more comprehensive one; from a vague and general grasp of a subject to an insight that explains all the details, and sees the relations of all parts of the whole.

In so far as manual training schools teach the scientific principles that underlie the practical points of their work they add intellectual education to physical education. Instruction in the natural sciences gives knowledge of nature both as to its modes of existence and as to the forces that form and transform those modes of existence. Natural science, it will be readily admitted, is directly tributary to the

emancipation of the laborer because it leads more and more to the invention of machinery. Machinery does the drudgery of the work and leaves to the laborer only the task of supervision. It assumes the physical labor and gives him the intellectual labor of directing and managing it. The more complete the machine becomes the more operations it includes in its process, the more intellect is required to manage it, and the greater becomes its productiveness.

Compare the study of natural science in its general phases with its special applications of the theory of special machines and it is seen that the study of the more general is more highly educative; and your committee would call special attention to the principle on which this conclusion is based. That is more highly educative which lasts longest and has widest scope in its enlightening effects. The explanation of the special machine (the steam engine, for example) is an intellectual acquisition for to-day, and it gives one a ready insight into all other examples to be met with in future experience. But the study of the theories of heat and of the dynamics of elastic fluids gives insight not only into the steam engine but also into a thousand other applications (spouting geysers, oil wells, heating and ventilating houses, meteorology, for example) within one's experience and numberless thousands of examples possible in future experience. Hence the study of pure science is more educative intellectually than the study of special applications of it.

Again the study of applications of science is more educative than the labor of making the machine. The theory of its operation involves all realizations of it and is not exhausted until all real and possible varieties of construction have been explained by it. But the construction of a machine adopts one of an indefinite number of styles of construction, uses one kind of material out of many for each of the parts and encounters peculiar difficulties of one kind and another occasioned by temporary conditions that have nothing to do with the nature of the machine or with its construction elsewhere. The laborer thus obscures his general view of the principle of the machine by covering it up with a great collection of details that do not essentially concern it. He is much more impressed with accidental matters of no account in the theory of the working of the machine than he is with the principles of its action. In a second experiment at constructing a machine old difficulties disappear and new ones arise. The intellectual education is of narrow scope and limited in time.

The intellectual factor of manual labor is never very large even in the first construction of a new type of product. The moral education in manual training in the way of perseverance, patience and plodding industry is a far greater educational factor than the intellectual factor.

The education of the muscles of the hand and arm, the training of the eye in accuracy go for something in way of education, especially if these too are of a general character and productive of skill in many arts. But it happens in most cases that the training of the muscles for a special operation unfits it more or less for the other special operations. Every trade has its special knack or skill and not only requires special education to fit the laborer to pursue it, but it reacts on him and fixes in his bodily organism certain limitations which for greater or less extent unfit him for other occupations. The work of blacksmithing, for instance, would unfit one for engraving; the work in planing and sawing would diminish the skill of the wood carver. Work in the trades that deal with wood and metals (and these include the entire curriculum of the manual training school) would be disadvantageous to the delicate touch required by the laborer on textile manufactures, and this class of laborers is nearly as large as the combined classes of wood and metal workers.

Your committee find that the course of study in manual training, in so far as it concerns the education of the hand is limited to a narrow circle of trades in the wood and metal industries, and that so far as it is auxiliary to trades and occupations directly, it covers the work of only one in twelve of the laborers actually employed in the United States.

Indirectly, as dealing especially with the construction of machinery, it has a much wider application, and your committee believe that all laborers who employ machines or tools of any description would be benefited to a greater or less degree by a course of manual training, and that there is something educative in it for all who are to use machines. This is the most important argument that can be urged by the advocates of the manual training school in behalf of its educative value.

FALLACIOUS ARGUMENTS DISCUSSED.

Your committee would here call attention to other arguments often used which are weak and misleading, such for example as the statement that manual training cultivates the powers of attention, perseverance and industry. These are formal

powers and not substantial, that is to say, they derive their value from what they are applied to, and they may be mischievous as well as beneficial. The power of attention may be cultivated by the game of chess or the game of whist, or of draw poker, or to the picking of pockets, but it is only attention to those subjects and not attention in general that is cultivated. The whist player who has developed careful circumspection, keen attention, the calculation of probabilities in the matter of cards is quite likely not to manifest them in regard to higher matters of observation of nature or the study of man. All games of boys, for instance marbles, quoits, base ball, jack straws, are educative, especially in such matters as are named as results of manual training, namely: (a) the development of the physical powers; (b) the acquisition of dexterity of hand and accuracy of eye; (c) in perseverance; (d) in attention. These moreover carry with them some general training and give the boy a similar ability in a field of related subjects. But it would not be fair to expect that these qualities of mind would show themselves in the boy's work in mathematics or history, for his interest in these games might make him dull and inattentive to all school studies. Boys may love the work of the manual training school and dislike history, grammar and mathematics, and all book learning, in fact; but to be excellent in manual training would not prevent him from being illiterate and a bad neighbor and a bad citizen — even a dynamiter.

THE EDUCATIVE EFFECT IS IN INVERSE RATIO TO THE SKILL ACQUIRED.

Your committee would further call attention to the fact that what is educative at one time may be entirely without such an effect at another, or, indeed, it may be deadening to the mind. Thus the advocates of manual training admit that it is useful as education only if not carried to the point of arriving at skill in production. This feature, of course, makes against the economical argument in behalf of such schools. According to the economic view skill in production is the primary object aimed at by introducing the training of the hand into schools. But M. Sluys, the Belgian Normal school director who reports on the Swedish system, says that when the child is compelled to manufacture large numbers of a given object in order to acquire skill in the work, the educative value of the work diminishes. "From the third or fourth sample his interest wanes; mechanical repetition invariably excites disgust for any work."

Your committee would call attention here to the fact that if an educative opportunity is gained by not requiring mechanical repetition to the point of acquiring skill, there is also an educative opportunity lost; for the patience and perseverance that pursues its work to the end and bravely keeps down any tendencies to disgust at the lack of novelty is a moral education indispensable to success in any manual calling. No teaching in the studies of the schools as they are would be esteemed of a high order if it did not train its pupils to attack difficult studies like arithmetic and grammar and courageously overcome them. Mere natural disinclination and impatience must be conquered before the child can become a rational being.

THE GREAT VALUE OF INDUSTRIAL ART DRAWING IN ÆSTHETIC TRAINING.

Your committee would further suggest that no justice as yet has been done by the advocates of manual training to the claims of industrial drawing as a training for the hand and eye and the æsthetic sense. If the pupil pursues this study by the analysis of the historical forms of ornament, and acquires familiarity with graceful outlines and a genuine taste for the creation of beautiful and tasteful forms, he has done more towards satisfying the economic problem of industry than he could do by much mechanical skill.

THE IMPORTANCE OF ÆSTHETIC CULTURE.

The great problem in the industry of nations has come to be the æsthetic one — how to give attractive and tasteful forms to productions so as to gain and hold the markets of the world.

The object of the study of drawing in our schools is not the acquirement of a "new art of expression," to use the stale definition put forward by some of the advocates of the self-styled "new education," because it is not worth the pains to learn the art of drawing merely to make pictures of what is seen or what is fancied. Rather is drawing the best means of acquiring familiarity with the conventional forms of beauty in ornament — forms that express the outlines of freedom and gracefulness and charm all peoples, even those who have not the skill to produce such forms.

Some nations, like the French for example, have educated their working classes for many generations in this matter of taste, and it has become a second nature. Other nations, the Anglo-Saxon among them, are not naturally gifted with a taste for the production of the beautiful, but rather with a tendency to look for the dynamic, the lines of force rather than of freedom. They are content to produce what is strong and durable and useful. But this has led them to the discovery that they must also be content with inferior places in international expositions and with a virtual exclusion from the markets of the world. Only a high tariff can force any considerable consumption of useful articles of clumsy and unsightly shapes.

In view of these facts your committee have deemed it desirable to mention industrial drawing and the true method of teaching it by the analysis and production of the standard ideals in ornament, as worthy of most careful consideration on the part of all, and especially on the part of all interested in manual training instruction, either for its economical or its educative advantages. Respectfully submitted.

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